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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* M. ASHRAF IMAM,  
BHAKTA B. RATH and TEDDY M. KELLER

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Appeal 2009-005980  
Application 08/845,897  
Technology Center 1700

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Decided:<sup>1</sup> July 22, 2009

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Before CHUNG K. PAK, CHARLES F. WARREN, and  
PETER F. KRATZ, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

DECISION ON APPEAL

Applicants appeal to the Board from the decision of the Primary Examiner finally rejecting claims 1 through 4, 7, 11, and 17 through 28 in

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<sup>1</sup> The two month time period for filing an appeal or commencing a civil action specified in 37 C.F.R. § 1.304, begins to run from the Decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

the Office Action mailed August 10, 2007. 35 U.S.C. §§ 6 and 134(a) (2002); 37 C.F.R. § 41.31(a) (2007).

We reverse the decision of the Primary Examiner.

Claim 1 illustrates Appellants' invention of an acoustically damping composite article, and is representative of the claims on appeal:

1. An acoustically damping composite article, comprising:  
a non-elastomeric polymeric matrix having therein a metal foam, said metal foam having an open cell structure, said metal foam being impregnated with said polymeric matrix so as to completely penetrate said open cell structure of said foam and fill the cells thereof; and  
optionally, one or more additional components selected from a catalyst, a curing agent, a curing additive, and a release agent, wherein the article comprises from about 60 to about 95 vol.% of the polymer matrix.

The Examiner relies upon the evidence in these references:

Tsang	4,605,595	Aug. 12, 1986
Akiyama	4,713,277	Dec. 15, 1987
Yang	5,516,592	May 14, 1996

Appellants rely upon the evidence in this reference in rebuttal:

Mel. M. Schwartz, *Composite Material*, in 4 McGraw-Hill Encyclopedia of Science & Technology 508-514 (9th ed., McGraw-Hill, Inc. 2002) (hereinafter Schwartz).

Appellants request review of the following grounds of rejection advanced on appeal by the Examiner (App. Br. 4):<sup>2</sup>  
claims 1 through 4, 7, 11, 19, 22, 23, and 25 through 28 under 35 U.S.C. § 102(b) over Tsang (Ans. 3);  
claims 17, 18, 20, 21, and 24 under 35 U.S.C. § 103(a) over Tsang (Ans. 3);  
and

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<sup>2</sup> We considered the Appeal Brief filed December 21, 2007, the Examiner's Answer mailed February 8, 2008, and the Reply Brief filed April 3 2008.

claims 1 through 4, 7, 11, and 17 through 28 under 35 U.S.C. § 103(a) over Yang in view of Akiyama (Ans. 5).

### Issues

The issues in this appeal are whether Appellants have shown that the evidence in Tsang and the combined teachings of Yang and Akiyama do not support the Examiner's finding of prima facie anticipation and conclusion of prima facie obviousness over Tsang, and conclusion of prima facie obviousness over the combined teachings of Yang and Akiyama, which issues turn on the issue of the interpretation of independent claims 1, 21, and 22.

### Issue: Claim Interpretation

The dispositive issue with respect to all grounds of rejection is the broadest reasonable interpretation of the claim term “polymeric matrix” in claims 1, 21, and 22, in its ordinary usage in context as understood by one of ordinary skill in the art in light of the written description in the Specification. *See, e.g., In re ICON Health and Fitness, Inc.*, 496 F.3d 1374, 1378-79 (Fed. Cir. 2007); *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004), and cases cited therein; *In re Morris*, 127 F.3d 1048, 1054-55 (Fed. Cir. 1997). The term “polymeric matrix” appears in independent claim 1 in, among other places, the phrase “the article comprises from about 60 to about 95 vol.% of the polymeric matrix,” as well as in the phrase “a non-elastomeric polymeric matrix having therein a metal foam.” The same and similar language appears in independent claims 21 and 22.

We note here there is no dispute “[t]he claims do not preclude the polymeric matrix from having inorganic fillers” in view of the open-ended term “comprising” in the preamble and body of the claims. This term opens

the claims to include articles which contain any manner of additional components, including inorganic fillers. Ans. 5; App. Br. 5-6; Reply Br. 1. *See, e.g., Exxon Chem. Pats., Inc. v. Lubrizol Corp.*, 64 F.3d 1553, 1555 (Fed. Cir. 1995) (“The claimed composition is defined as comprising - meaning containing at least - five specific ingredients.”); *In re Baxter*, 656 F.2d 679, 686 (CCPA 1981) (“As long as one of the monomers in the reaction is propylene, any other monomer may be present, because the term ‘comprises’ permits the *inclusion* of other steps, elements, or materials.”).

Appellants submit “any such filler is not a part of the volume fraction of [the] polymeric matrix.” App. Br. 5. Appellants argue “[i]t is known in the field of composites that the matrix is a continuous phase surrounding the other components (e.g., fillers) of the composite.” App. Br. 5. Appellants point out Schwartz states the “major constituents of composites are fibers, particles, laminae or layers, flakes, fillers and matrices” in support of the argument “[t]he matrix is a separate constituent from any filler, and the filler is not a part of the matrix.” App. Br. 5, citing Schwartz, para. bridging 508-509. Appellants further point out a polymeric matrix containing fillers is not disclosed in the Specification. Reply Br. 1. Thus, Appellants submit “[t]he recited vol% of the polymer matrix in claim 1 refers to the amount of the polymer only.” App. Br. 5.

The Examiner submits the term “‘polymeric matrix’ . . . includes a polymeric binder and inorganic fillers.” Ans. 3 and 7. The Examiner argues “nothing in the Specification positively discloses that the polymer matrix is limited to the polymer only,” and “[t]here is no clear indication [in Schwartz] that the filler is separate from the polymer matrix.” Ans. 7 and 8.

We agree with Appellants' position. We determine the plain language of the phrase "a non-elastomeric polymeric matrix having therein a metal foam" in claim 1 specifies a "non-elastomeric polymeric matrix," that is, a "matrix" formed from "a non-elastomeric polymer" per se. That the "non-elastomeric polymeric matrix" as claimed is solely the polymeric material is further seen from the remainder of the subject phrase specifying the "polymeric matrix" as "having therein a metal foam" which "metal foam" is thus not a part of the "polymeric matrix." Our interpretation comports with the disclosure in the Specification which, as Appellants point out, does not describe a "matrix" having a structural component in addition to the polymeric material. *See Spec.*, e.g., 7, 8, and 12. Our interpretation further comports with the understanding of one of ordinary skill in this art, evinced on this record by Schwartz, that the matrices of a composite is different than other components of the composite, including fillers. Thus, while the claims do encompass articles containing inorganic filler, as the Examiner and Appellants agree, the filler is a component of the composite that is the article, is contained in the "polymeric matrix" in the same manner as the metal form, and is no more a part of the polymeric matrix than is the metal foam.

Accordingly, we are of the opinion that the term "polymeric matrix" specifies only a polymeric component, and the claimed article must comprise from about 60 to about 95 vol.% of only the polymeric component separate and apart from any other material, such as an inorganic filler, which may be present.

### Findings of Fact

We find Tsang would have disclosed to one of ordinary skill in this art an embodiment of an article in which open aluminum foam material is filled with a slurry made up of, among other things, inorganic fillers and an epoxy resin binder, and the composite cured. Tsang col. 4, ll. 6-35. The pore density and pore size of the foam structure is disclosed, but the amounts of resin binder and other components in the slurry and the amount of the slurry impregnating the foam structure is not described. Tsang col. 4, ll. 6-35.

Tsang teaches “[t]he binder when cured formed a second matrix for holding the filler” and other components in a three dimensional structural open foam material. Tsang col. 1, l. 53 to col. 2, l. 23; *see also* col. 3, ll. 19-32. “In most instances, the liquid binders should make up about 30-40% by weight of the total mixture for ease in handling.” Tsang col. 3, ll. 25-27.

We find Yang would have disclosed to one of ordinary skill in this art the illustrative embodiment of Example 1 wherein a foamed aluminum alloy plate is soaked in an inorganic hardness-reinforcement composition containing 64 wt.% marble powder, 35 wt.% epoxy resin, and 1 wt.% amine curing agent. Yang col. 4, ll. 52-61; *see also* col. 2, l. 33 to col. 3, l. 12, and col. 3, l. 50 to col. 4, l. 8. The pore density and pore size of the foamed aluminum alloy plate and the amount of the inorganic hardness-reinforcement composition impregnating the foamed plate are not described. Yang col. 4, ll. 52-61. Yang’s patent claim 7 encompasses a “foamed aluminum alloy plate [having] a specific density between about 0.47 and 0.53.” Yang col. 6, ll. 14-16.

We find Akiyama would have disclosed to one of ordinary skill in this art a foamed aluminum having “an apparent specific gravity of from 0.2 to 0.8 and comprises an aggregate of polygonal closed cells of from 2 to 10 mm in average diameter.” Akiyama abstract; *see also* col. 1, ll. 3-15.

#### Discussion

We considered the totality of the record in light of Appellants’ arguments with respect to claims 1, 21, and 22 and the grounds of rejection advanced on Appeal. *See, e.g., In re Kahn*, 441 F.3d 977, 985-86 (Fed. Cir. 2006) (“On appeal to the Board, an applicant can overcome a rejection by showing insufficient evidence of *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness.”) (quoting *In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998)); *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992) (“After evidence or argument is submitted by the applicant in response, patentability is determined on the totality of the record, by a preponderance of evidence with due consideration to persuasiveness of argument.”) (citing, *inter alia*, *In re Spada*, 911 F.2d 705, 707 n.3 (Fed. Cir. 1990)).

On this record, we are of the opinion Appellants have established that the evidence in Tsang and the combined teachings of Yang and Akiyama do not support the Examiner’s finding of *prima facie* anticipation and conclusion of *prima facie* obviousness over Tsang, and conclusion of *prima facie* obviousness over the combined teachings of Yang and Akiyama. We agree with Appellants the evidence in the references does not establish that the amount of resin binder impregnating the foam structure meets the claim limitation “the article comprises from about 60 to about 95 vol.% of the polymer matrix” in view of the disclosures in Tsang and Yang of the



amounts of the polymeric binders in the compositions and the absence of the disclosure therein of the amounts of the compositions impregnated into the foam aluminum articles. App. Br. 4-8; *see* Ans. 3-9.

Accordingly, in the absence of a *prima facie* case of anticipation and *prima facie* cases of obviousness, we reverse the grounds of rejection of 1 through 4, 7, 11, and 17 through 28 under 35 U.S.C. §§ 102(b) and 103(a).

The Primary Examiner's decision is reversed.

REVERSED

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NAVAL RESEARCH LABORATORY  
ASSOCIATE COUNSEL (PATENTS)  
CODE 1008.2  
4555 OVERLOOK AVENUE, S.W.  
WASHINGTON, D.C. 20375-5320